IVH Prevention in the First 72 Hours

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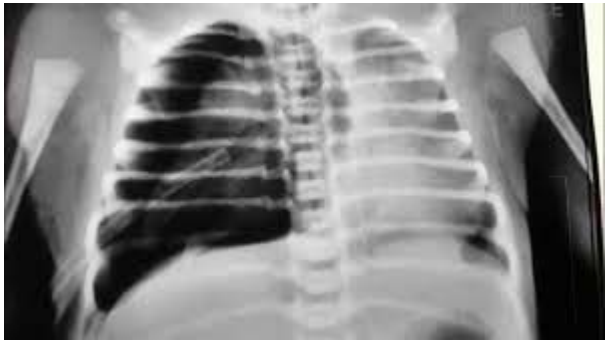
What we (maybe) know…

A sampling of data since 2020

Early Postnatal Risk Factors for IVH

- Extreme blood pressures/swings
- Significant acidosis/CO2 instability
- Intubation
- Pneumothorax
- High pressure ventilation
- Transport after birth
- Hemodynamically significant PDA



Several centers have published “bundles” that showed a reduction in severe IVH, many of them QI projects

Bijl-Marcus et al in 2020: 2 Dutch tertiary centers, 561 infants (pre/post)

→Reduced risk of severe IVH/PVL/mortality (OR 0.43, CI 0.27-0.65)

The “Classic” Bundle:

- Head in midline
- Tilting head of incubator 10-30 degrees
- Avoidance of flushing/rapid withdrawal of blood
- -Minimal handling/suctioning
- Interventions for pain/stress relief
- Avoidance of sudden elevation of legs

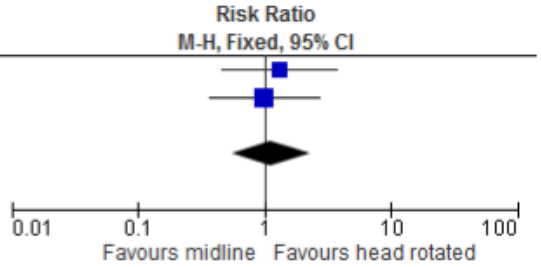
But similar studies have shown no benefit

- A similar (and more detailed) IVH protocol was implemented by Gross et al in 2022 on 247 patients in Germany and found no difference in IVH or severe IVH (CI 0.67-1.55)
- A Bayesian analysis of an IVH bundle at the University of Washington including 565 babies found no difference in IVH (al-Haddad et al 2022)
- Cochrane Neonatal shows no benefit for midline head positioning (with limited data)

Any Intraventricular Hemorrhage

Study or Subgroup	supine midline Events	Total	supine head rotated Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Al-Abdi 2011	6	23	5	25	44.4%	1.30 [0.46, 3.70]
Al-Abdi 2015	6	31	6	31	55.6%	1.00 [0.36, 2.76]
Total (95% CI)		**54**		**56**	**100.0%**	**1.14 [0.55, 2.35]**
Total events	12		11			

Heterogeneity: Chi² = 0.13, df = 1 (P = 0.72); I² = 0%
Test for overall effect: Z = 0.34 (P = 0.73)

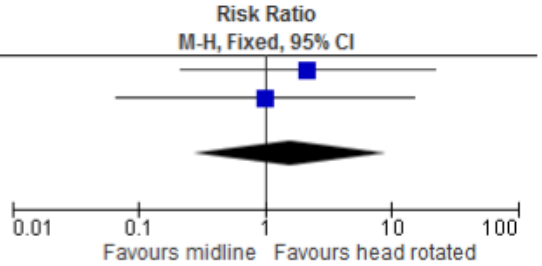


Typical RR 1.14 (95% CI 0.55 to 2.35)

Severe Intraventricular Hemorrhage (Grades 3 and 4)

Study or Subgroup	supine midline Events	Total	supine head rotated Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Al-Abdi 2011	2	23	1	25	48.9%	2.17 [0.21, 22.40]
Al-Abdi 2015	1	31	1	31	51.1%	1.00 [0.07, 15.28]
Total (95% CI)		**54**		**56**	**100.0%**	**1.57 [0.28, 8.98]**
Total events	3		2			

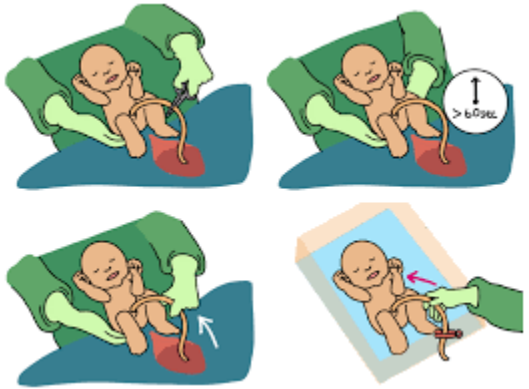
Heterogeneity: Chi² = 0.18, df = 1 (P = 0.67); I² = 0%
Test for overall effect: Z = 0.51 (P = 0.61)



Typical RR 1.57 (95% CI 0.28 to 8.98)

Romantsik O, Calevo MG, Bruschettini M. Cochrane Database of Systematic Reviews 2016, Issue 9. Art. No.: CD012362. DOI: 10.1002/14651858.CD012362.

Other Tools



- Delayed Cord Clamping:
  - Hemmati et al showed a reduction in Grades II-IV IVH (but not all IVH) in an RCT of 148 neonates; DCC group was 30-45 seconds
  - Cochrane showed a reduction in all IVH
- Prophylactic indomethacin (in the right group) reduces severe IVH

What we don’t know for sure, but sometimes try…

Some data but lots of questions still…

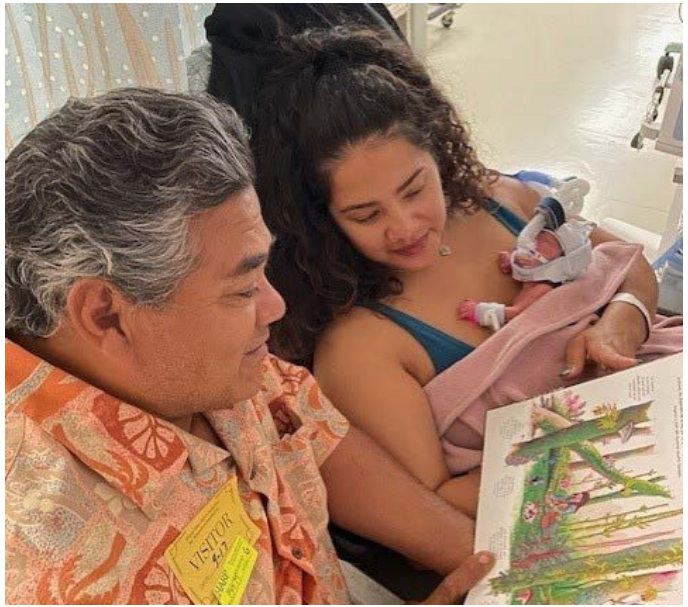
- Improving cardiac function and selective use of inotropes
- NIRS
- TcCO2
- Noise/stress/pain reduction

Our Approach at SMB for Infants <26 wks' GA

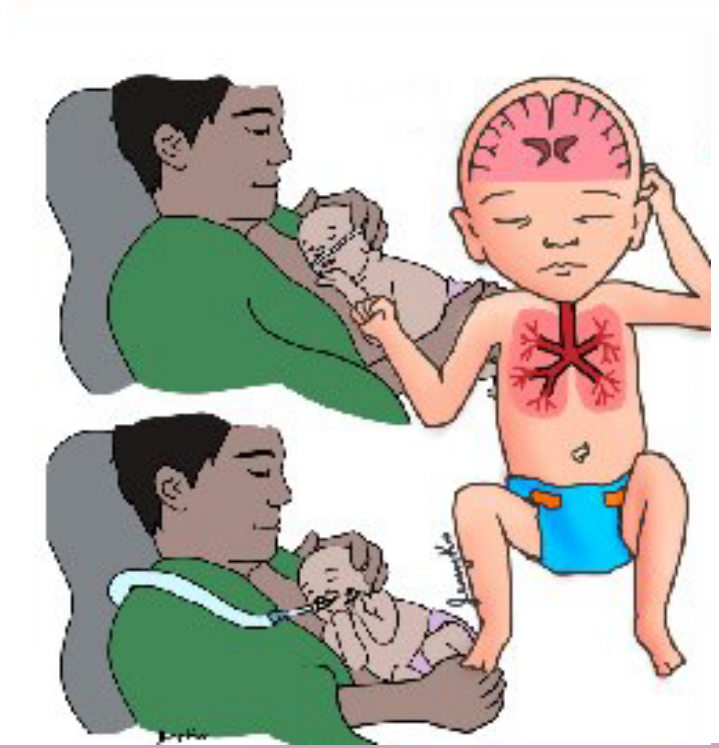
- 90 sec delayed cord clamping (ideally)
- Maintaining midline head positioning but with a focus on developmental care for 72 hours
- HOB elevated
- PCO2 range 40-55 for 72 hours
- Avoid lifting legs for diaper changes, sudden position changes, increased noise

- Encouraging skin to skin in the first 72 hours and positive parental touch in the first 24 hours
  - Attempt to maintain midline for STS, exceptions permitted
- Soft voices
- Protect eyes from bright lights
- Minimal handling/ 2 person hands on with cares
- Minimize invasive procedures

Skin to Skin in ELBWs



- Skin to skin done in side-lying position for first 72 hours
- Umbilical lines/PICCs/PALs are not contraindications
- If these infants are intubated, there is an “appointment” for the first hold with multiple staff, including an RCP, available for the transfers



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NICU Skin to Skin Care (STSC) Checklist

First Parental Contact
- ❑ Provide parental handout on STSC on admission with yellow Kardex

Within 24 hours of Appointment
- ❑ MD/NNP consent
- ❑ Make appointment
- ❑ Give appointment card to parents
- ❑ Offer to show transfer video on iPad
- ❑ CRN to write appointment time on whiteboard
- ❑ Notify CRN, RT Charge, ALS of time
- ❑ Exclusion Criteria:
  - ❑ Chest tube
  - ❑ HFJV/HFOV
  - ❑ Paralytics
  - ❑ FI02 >50%
  - ❑ >5 events in the past 12 hours
  - ❑ Multiple vasopressors or Dopamine/Dobutamine >5mcg/kg/min
  - ❑ Extubated to CPAP <6 hours

Please contact the provider for an order if your patient has the following:
- ❑ PAL line
- ❑ iNO
- ❑ EEG with no documented seizures
- ❑ Vasopressors (Dopamine/Dobutamine <5mcg/kg/min)

Checklists for the Day of STSC

RN Checklist
- ❑ Check with bedside RT, CRN, Resource & podmates to notify time of STSC. Discuss scheduled time and duration of STSC.
- ❑ Obtain chair, 2 pillows, 2 rolls of tape, 2 suction tubing, mirror
- ❑ Notify MD/NNP of appointment time and confirm no known unit conflicts/potential pending admissions. (Notify for patients <29 weeks for first hold)

RT Checklist
- ❑ Check with charge RT and notify of time of kangaroo
- ❑ Obtain suction supplies
- ❑ Find cap for Ballard
- ❑ Obtain 2 Velcro straps

Parent Checklist
- ❑ Use bathroom
- ❑ Pump
- ❑ Drink water
- ❑ Offer gown/wrap
- ❑ Discuss seated/standing transfer

Baby Checklist
- ❑ Check & secure lines
- ❑ Put hat on baby

At the time of transfer
- ❑ Obtain warm blanket
- ❑ RT & RN to suction patient
- ❑ RN to have another RN at bedside to follow with lines
- ❑ Assign roles and designate what each person does and where each person will stand
- ❑ Position patient *For transfer and positioning midline techniques refer to video on Sharpnet
  - ❑ <72hr old: side lying, midline
  - ❑ >72hr old: prone, upright
- ❑ RN to perform vitals pre, post, q 15 minutes x 2 & hourly.

Allow patient 15 minutes to adjust to being held
Signs & Symptoms that patient is not tolerating
- ❑ >3 Apnea/Bradycardia events
- ❑ Increase of >10% Fi02
- ❑ Patient cold

Baby is positioned sideway.

Head is kept in midline.

Head and body are aligned.

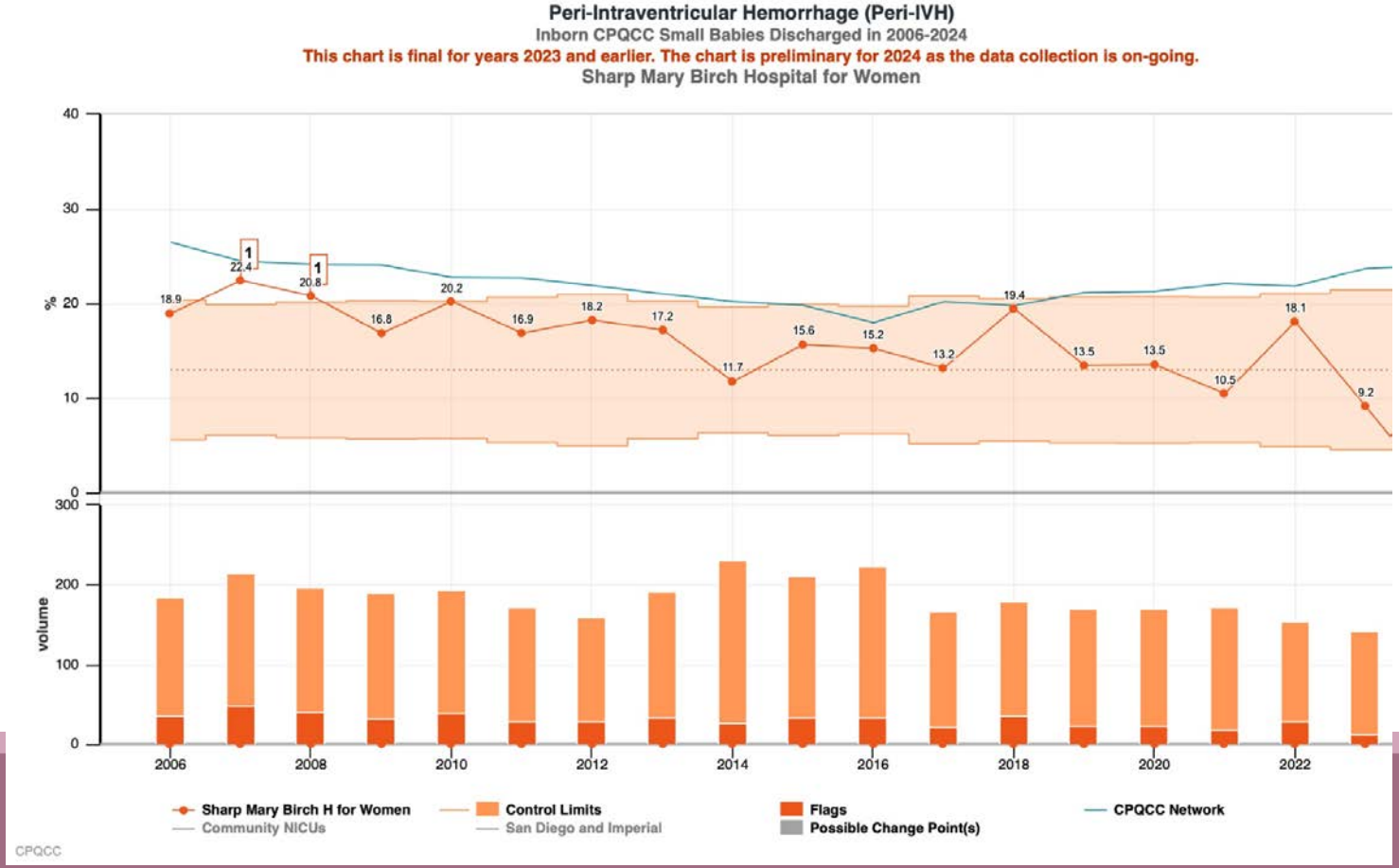
Skin to Skin in ELBWs

- It has been tolerated well in this without line dislodgements or extubations
- We also found no evidence in the literature of adverse outcomes associated with early STS in this population
- We have “eased” in to expanded eligibility criteria over time with our good track record as leverage

Developmental care that starts at birth but goes beyond the first 72 hrs

- Circadian lighting in the unit and quiet hour
- PAIN bundle to minimize and support painful/stressful experiences
  - Two-person care whenever possible to optimize containment and comfort
- Interventions to decrease “pokes”

Our Outcomes



Severe Peri-Intraventricular Hemorrhage

Inborn CPQCC Small Babies Discharged in 2006-2024

This chart is final for years 2023 and earlier. The chart is preliminary for 2024 as the data collection is on-going.

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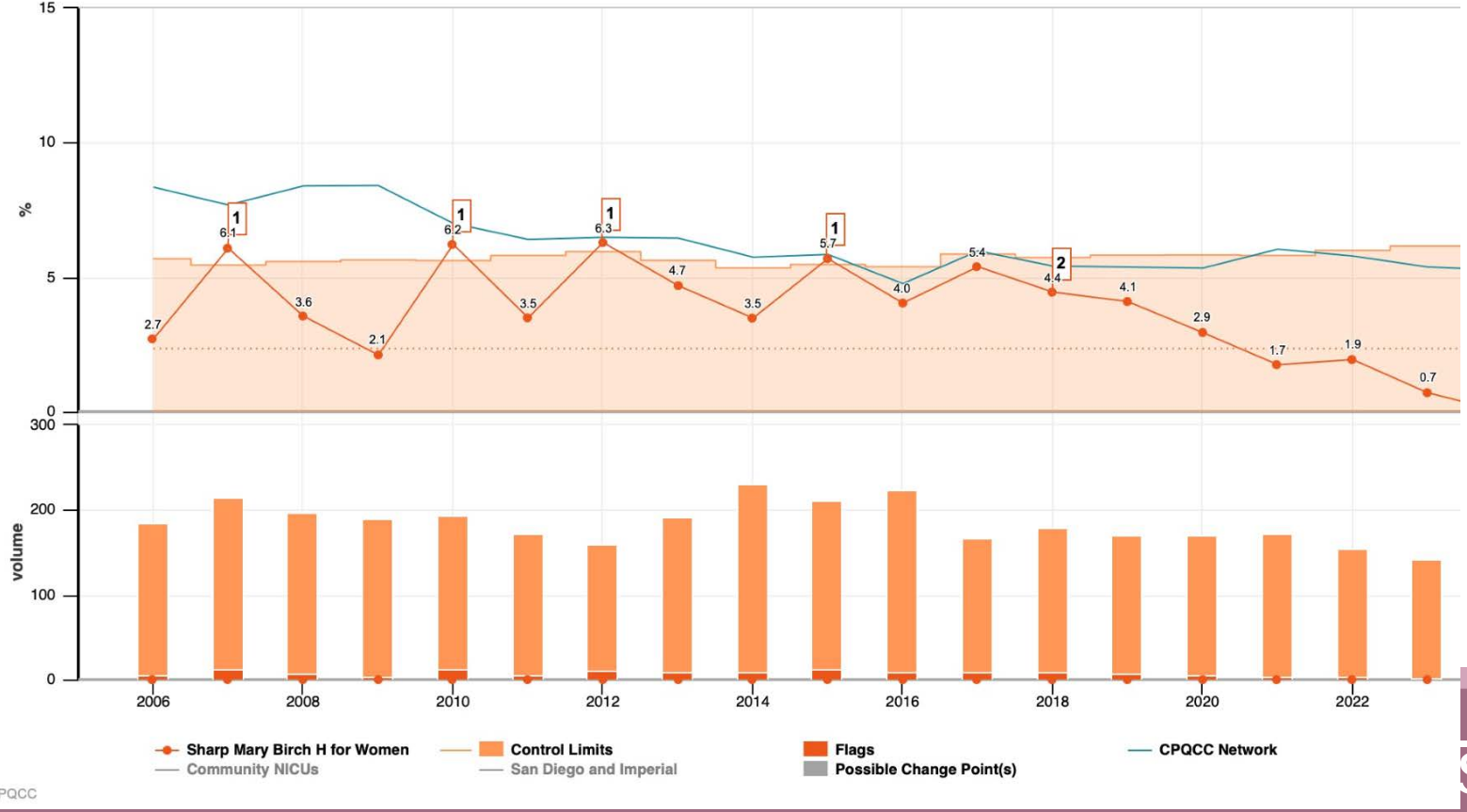

CPQCC

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Association but not causation – what we have changed in the past 3 years

- Decreased delivery room intubations/added DR bubble CPAP
- DCC extended to 90 sec (when feasible)
- Early skin to skin in preterm infants – often in the first 72 hrs

References

de Bijl-Marcus K, Brouwer AJ, De Vries LS, *et al*. Neonatal care bundles are associated with a reduction in the incidence of intraventricular haemorrhage in preterm infants: a multicentre cohort study. *Archives of Disease in Childhood - Fetal and Neonatal Edition* 2020;**105:**419-424.

Gross M, Engel C, Trotter A. Evaluating the Effect of a Neonatal Care Bundle for the Prevention of Intraventricular Hemorrhage in Preterm Infants. *Children*. 2021; 8(4):257.

Hemmati, F., Sharma, D., Namavar Jahromi, B., Salarian, L., & Farahbakhsh, N. (2020). Delayed cord clamping for prevention of intraventricular hemorrhage in preterm neonates: a randomized control trial. *The Journal of Maternal-Fetal & Neonatal Medicine*, *35*(19), 3633–3639.

al-Haddad, B.J.S., Bergam, B., Johnson, A. *et al.* Effectiveness of a care bundle for primary prevention of intraventricular hemorrhage in high-risk neonates: a Bayesian analysis. *J Perinatol* 43, 722–727 (2023).

Pie-Chen Tsao. Pediatric Intraventricular hemorrhage (IVH) and posthemorrhagic hydrocephalus (PHH) in preterm infants
J Korean Neurosurg Soc 2023;66(3):228-238.

Romantsik O, Calevo MG, Bruschettini M. Head midline position for preventing the occurrence or extension of germinal matrix-intraventricular haemorrhage in preterm infants. Cochrane Database of Systematic Reviews 2020, Issue 7. Art. No.: CD012362. DOI: 10.1002/14651858.CD012362.pub3. Accessed 08 October 2024.

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Thank You!

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